

2
3 A CARGO LAMP ASSEMBLY FOR VEHICLES

4
5 BACKGROUND OF THE INVENTION

6 1. Field of the Invention

7 The invention relates to lamp units for vehicles and is
8 directed more particularly to a cargo lamp assembly featuring a
9 light emitting diode.

10 2. Description of the Prior Art

11 Combined cargo lamp and center high mounted stop lamp
12 assemblies are generally known. In U.S. Patent No. 4,891,625,
13 issued January 2, 1990 to Bradley C. Van Riper et al, there is
14 shown and discussed a combined center high mounted stop lamp and
15 cargo lamp assembly for pick-up trucks, vans, and the like. The
16 assembly includes a housing for three side-by-side lamps. Each
17 lamp features an incandescent bulb and a parabolic reflector, and
18 an appropriate lens, red for the stop lamp lens and clear for the
19 cargo lamp lenses.

20 Another combined cargo lamp and stop lamp is shown and
21 described in U.S. Patent No. 6,086,230, issued July 11, 2000 to
22 George Wooldridge et al. In this instance, the combination is
23 adapted for disposition on a rear cargo door of a panel truck,
24 sport utility vehicle, or the like, wherein a rear cargo door is
25 pivotally mounted on a side edge thereof. The combination
26 features two lamps, a stop lamp for exhibiting a stop-signal, and
27 a cargo lamp for lighting the interior of the vehicle. The

1 assembly features various types of incandescent light bulbs, such
2 as snap-in, plug in and/or hard wired.

3 The use of incandescent bulbs presents a number of problems.
4 Their size requires an appropriately sized housing. Their life
5 duration requires periodic replacement and can lead to loss of
6 use at inopportune times. Replacement requires service access
7 facility. In some instances, the temperature of functioning
8 incandescent bulbs, particularly in large numbers, can result in
9 problems relative to temperature-sensitive cargo.

10 Thus, there is a need for a cargo lamp assembly for
11 vehicles, which assembly is devoid of incandescent bulbs and,
12 rather, relies upon light emitting diodes (LED) for optical
13 enhancement of a cargo area.

14 There is further a need for such a cargo lamp assembly in
15 combination with a center high mounted stop lamp assembly, the
16 latter being of either a traditional structure or of an LED based
17 structure.

18 19 SUMMARY OF THE INVENTION

20 Accordingly, an object of the invention is to provide a
21 cargo lamp assembly for vehicles, the lamp including a white
22 light emitting diode and a lens for appropriately configuring the
23 beam of light emitted by the diode.

24 A further object of the invention is to provide a combined
25 cargo lamp assembly, as set forth immediately above, and stop
26 light assembly for vehicles.

27 With the above and other objects in view, a feature of the
28 invention is the provision of a cargo lamp assembly for vehicles.

1 The assembly comprises a white light emitting diode having an
2 aperture for emitting a light beam in an arc of 120° in a
3 horizontal plane, and 120° in a vertical plane, and a lens for
4 receiving the beam and reducing the beam to about 60° in the
5 horizontal plane and in the vertical plane.

6 In accordance with a further feature of the invention, there
7 is provided a cargo lamp assembly for vehicles. The assembly
8 comprises a white light emitting diode (LED) having an aperture
9 for emitting a light beam in an arc of x° to the left and x° to
10 the right of a central axis of the beam in a horizontal plane,
11 and a lens for reducing the beam to an arc of about $1/2x^\circ$ to the
12 left and about $1/2x^\circ$ to the right of the central axis, the lens
13 being configured in horizontal cross section to provide a lens
14 focal point about twice the distance from the lens as the
15 distance of the LED from the lens.

16 In accordance with a further feature of the invention, there
17 is provided a cargo lamp assembly for vehicles. The assembly
18 comprises a white LED having an aperture for emitting a light
19 beam in an arc of y° above and y° below a central axis of the
20 beam in a vertical plane, and a lens for reducing the beam to an
21 arc including in the vertical plane an upper boundary deflected
22 downwardly about 10° relative to a horizontal plane, and a lower
23 boundary of about $1/2y^\circ + 10^\circ$, the lens being configured in
24 vertical cross section to provide a lens focal point coincident
25 with the distance from the lens to the LED.

26 In accordance with a still further feature of the invention,
27 there is provided a combined assembly of a center high mounted
28 stop lamp (CHMSL) assembly and a cargo lamp assembly for a

1 vehicle. The combined assembly comprises a housing for mounting
2 on a rearwardly facing wall surface of a body portion of the
3 vehicle proximate a top thereof and proximate a transverse center
4 of the vehicle, the housing having compartments including at
5 least one compartment for housing a CHMSL component and having a
6 stop lens. The housing further includes left and right
7 compartments, respectively on opposite sides of the CHMSL
8 compartment, each having a cargo light lens and a white LED for
9 directing a beam of light to the respective cargo light lens.
10 Each of the cargo lamp assemblies comprises one of the cargo
11 lenses and one of the LEDs, the LEDs each having an aperture for
12 emitting the light beam in an arc of about 120° in horizontal and
13 vertical planes, and each of the cargo lenses being adapted to
14 reduce the light beam in a horizontal plane to about 60° and
15 reducing the light beam in a vertical plane to about 60°.

16 The above and other features of the invention, including
17 various novel details of construction and combinations of parts,
18 will now be more particularly described with reference to the
19 accompanying drawings and pointed out in the claims. It will be
20 understood that the particular device embodying the invention is
21 shown by way of illustration only and not as a limitation of the
22 invention. The principles and features of this invention may be
23 employed in various and numerous embodiments without departing
24 from the scope of the invention.

25
26 BRIEF DESCRIPTION OF THE DRAWINGS

1 Reference is made to the accompanying drawings in which is
2 shown an illustrative embodiment of the invention, from which its
3 novel features and advantages will be apparent.

4 In the drawings:

5 FIG. 1 is a perspective view of one form of combined center
6 high mounted stop lamp assemblies and cargo lamp assemblies
7 illustrative of an embodiment of the invention;

8 FIG. 2 is a rear elevational view of the combined assemblies
9 of FIG. 1;

10 FIG. 3 is a diagrammatic view of a cargo lamp assembly,
11 including a sectional view of a lens portion of the assembly
12 taken along line III-III of FIG. 2; and illustrative of an
13 embodiment of the invention; and

14 FIG. 4 is a diagrammatic view of the cargo lamp assembly of
15 FIG. 3, including a sectional view of the lens portion of the
16 assembly taken along line IV-IV of FIG. 2.

17 18 DESCRIPTION OF THE PREFERRED EMBODIMENTS

19 Referring to FIGS. 1 and 2, it will be seen that an
20 illustrative embodiment of the invention includes a housing 10
21 for one or more center high mounted stop lamp (CHMSL) assemblies
22 12 and one or more cargo lamp assemblies 14. As illustrated in
23 FIGS. 1 and 2, the combined assemblies typically include a series
24 of the side-by-side stop lamp assemblies 12 and a cargo light
25 assembly 14 on opposite ends of the series of stop lamp
26 assemblies.

27 The housing 10 typically is mounted, as by a connector 16
28 (FIG. 1), to a rearwardly facing wall surface of a body portion

1 of a vehicle (not shown), such as a pick-up truck, or the like,
2 the housing being mounted proximate a transverse center of the
3 vehicle. The stop lamp assemblies 12 are each provided with a
4 stop lamp lens 18, usually red in color. The cargo lamp
5 assemblies 14 are each provided with a clear lens 20.

6 Referring to FIG. 3, it will be seen that each cargo lamp
7 assembly 14 includes a white LED 22 having an aperture for
8 emitting a light beam 24 in an arc a of about 120° in a
9 horizontal plane, about 60° to the right of a beam axis 26 and
10 60° to the left. The emitted beam 24 is emitted in the vertical
11 plane (FIG. 4) about 60° above the beam axis 26 and 60° below the
12 beam axis.

13 The cargo lamp assembly 14 includes the lens 20 which is
14 provided with a configuration different in horizontal section
15 (FIG. 3) than in vertical section (FIG. 4). The cargo lamp lens
16 20 reduces the arc a of the beam 24 in the horizontal plane to
17 about 60° , about 30° to the left of the beam axis 26 and 30° to
18 the right of the beam axis. A beam 28 emitted by the lens 20, in
19 the horizontal plane (FIG. 3) includes a right boundary r and a
20 left boundary l which are substantially parallel to each other.

21 The cargo lamp lens 20 reduces the arc a' of the beam 24 in
22 the vertical plane (FIG. 4) to about 60° . The beam 28 emitted by
23 the lens 20 in the vertical plane includes a top boundary t
24 deflected downwardly about 10° relative to the horizontal plane,
25 and a lower boundary b extending downwardly about 70° relative to
26 the horizontal plane.

27 In the horizontal plane, the LED 22 is disposed at a
28 distance d from the lens 20 which is about one-half a distance f

1 to a focal point F of the LED, as shown in FIG. 3. In the
2 vertical plane, the LED 22 is disposed substantially at the focal
3 point F.

4 Preferably, the LED 22 is at least an 18 lumen LED and the
5 lens 20 emits at least about 10 candela. In a combined assembly
6 with two LEDs, each LED is preferably at least an 18 lumen LED,
7 such that the two cargo light assemblies emit at least about 20
8 candela, a more than adequate lighting for pick-up truck cargo
9 areas. Alternatively, a single 40 lumen LED, scheduled for
10 production in 2004 or 2005, should prove useful.

11 If the LED 22 provides an aperture so as to emit a different
12 arc of beam, x° to the left and x° to the right of the axis 26 in
13 the horizontal plane and y° above and y° below the central axis
14 26 of the beam 24 in the vertical plane, the lens 20 reduces the
15 arc in the horizontal plane to about $1/2x^\circ$ to the left and $1/2x^\circ$
16 to the right of the axis 26, and reduces the arc in the vertical
17 plane defined by the upper boundary t deflected downwardly about
18 10° relative to the horizontal plane and the lower boundary b of
19 about $1/2y^\circ + 10^\circ$.

20 The lens 20 may be a "Fresnel" type lens, well known in the
21 art, configured to produce the above described arcs. A Fresnel
22 type lens provides the advantages of reduced material
23 requirement, ease of molding, and resulting reduced costs in
24 manufacture.

25 Further, the lenses 18, 20 may be molded in one piece. The
26 one piece lens can be all clear, inasmuch as the CHMSL LED emits
27 red light, or can be in part clear and in part red.

1 There is thus provided a cargo lamp assembly for vehicles,
2 the lamp including a white light emitting diode and a lens for
3 appropriately configuring the beam of light emitted from the
4 diode.

5 It will be understood that many additional changes in the
6 details, materials, and arrangement of parts, which have been
7 herein described and illustrated in order to explain the nature
8 of the invention, may be made by those skilled in the art within
9 the principles and scope of the invention as expressed in the
10 appended claims.